

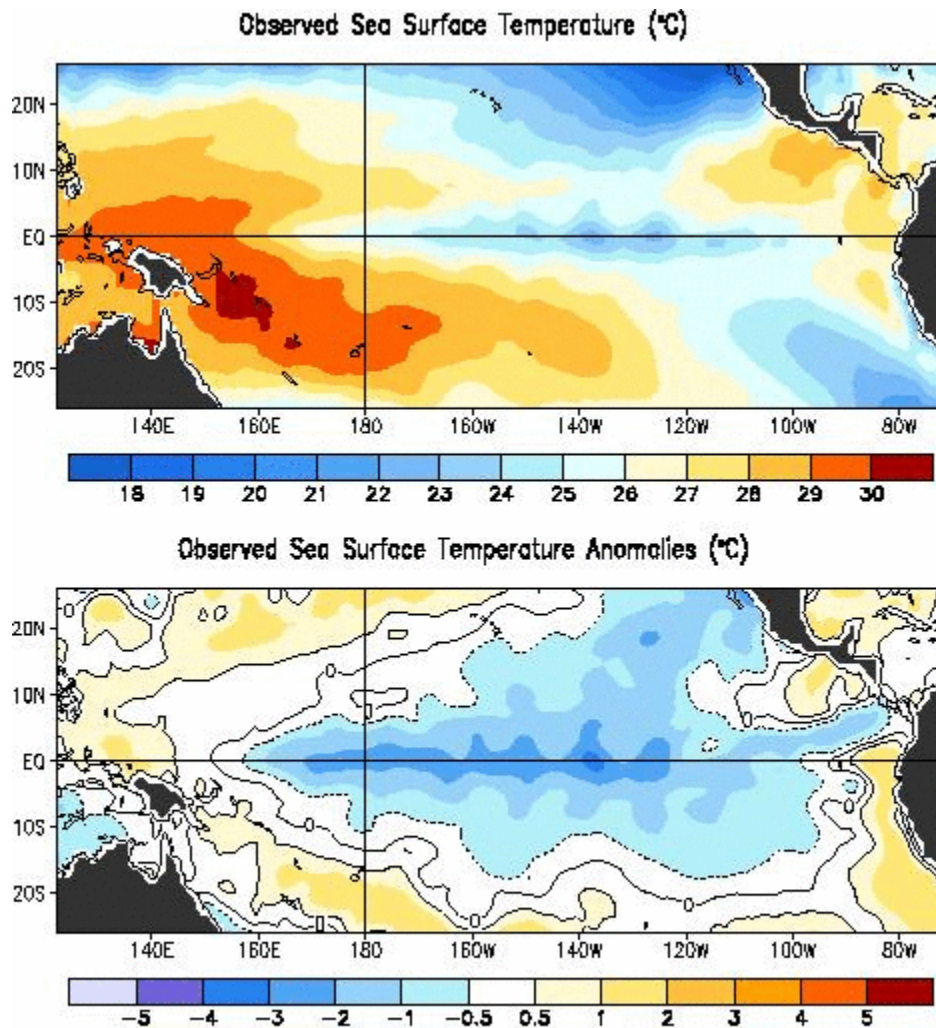
## 2008 Annual Summary

As the calendar turned to 2008, the snow kept coming. But unlike December, the storms in **January** packed a bigger punch. Four to ten inches of snow fell in the Cascade valleys on the 4<sup>th</sup>, and a widespread 5-10" of snow fell in the Spokane metro area and northern valleys on the 9<sup>th</sup>. High pressure built into the area for a brief break during the middle of the month. But this eventually opened the door to the lone Canadian air mass of the winter. As the arctic front came in it brought with it a few inches of fresh snow to many locations. Strong northeast winds resulting in drifting snow over the Palouse and Columbia Basin. Then the temperatures dropped to their coldest readings of the winter. Nighttime readings dropped into the single digits and below zero on the 21<sup>st</sup> through the 27<sup>th</sup>. The coldest reports included -14 at Mansfield, -13 at Omak, and -11 at Priest Lake, George, Mazama, and Twisp.

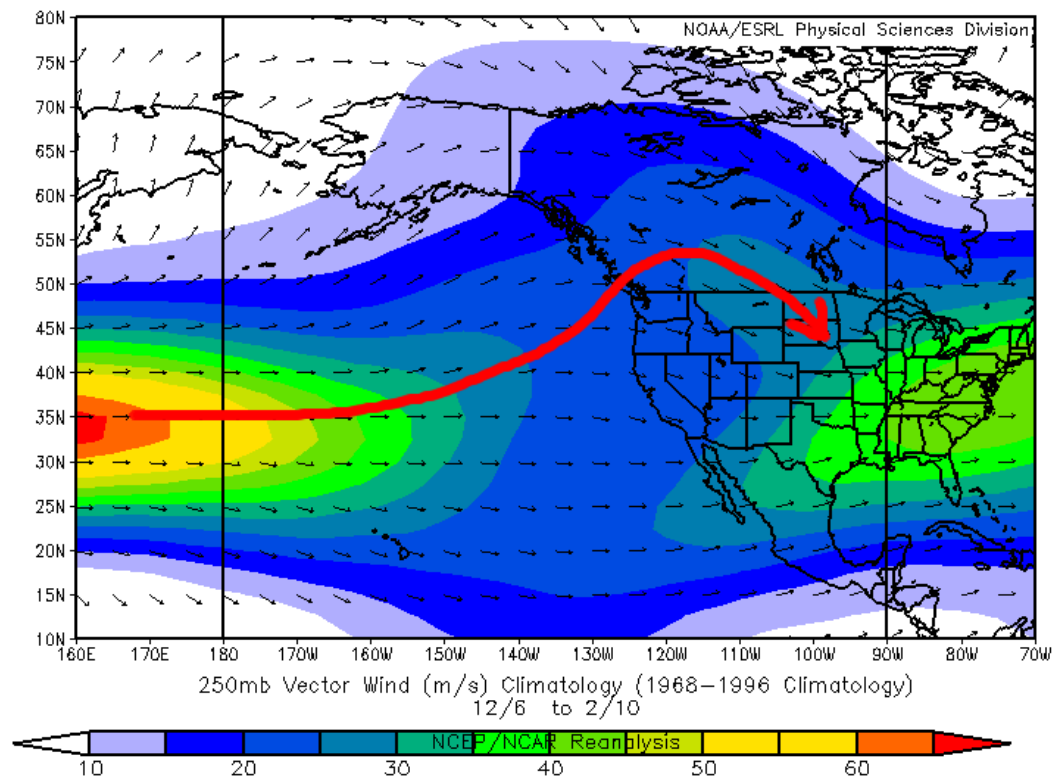
A somewhat unusual winter storm set up over the area for the weekend of the 26<sup>th</sup>/27<sup>th</sup>. A low pressure system off the California coast sent moisture into the area from the south. This collided with a cold front moving in from the northern Gulf of Alaska. The front stalled over eastern Washington through the weekend bringing heavy snow to many locations. Spokane airport recorded 13.7" of snow in approximately 30 hours, while some of the outlying locations of the metro area received over 20" for the two-day storm. As the storm exited the region the Palouse picked up more heavy snow with 7" falling in Moscow. In Lewiston 6.3" of snow fell, making it one of the snowiest days in recent memory. The month ended with one more wallop, another 5-8" of snow falling in the Panhandle and extreme eastern Washington. Strong winds from the southwest caused considerable drifting snow on the Palouse. When it was all over, 40.0" of snow had fallen at Spokane airport, making it the snowiest month since December 1996.

**February** continued the parade of snow storms. A widespread snowfall of 4-7" in the Panhandle and extreme eastern Washington on the 7<sup>th</sup> was followed by very strong winds. Peak winds from this event included 59 mph at Lewiston, 54 mph at Pullman, 48 mph at Spokane airport, and 61 mph at Beverly (near Vantage). This caused considerable drifting over the Palouse and western Spokane County, closing numerous roads. At this point the winter was looking very long to many. But suddenly, the weather pattern changed. High pressure moved over the area and the snow essentially stopped for the remainder of the month. A few weak systems moved through the high pressure but they only brought light amounts of rain or snow to the area.

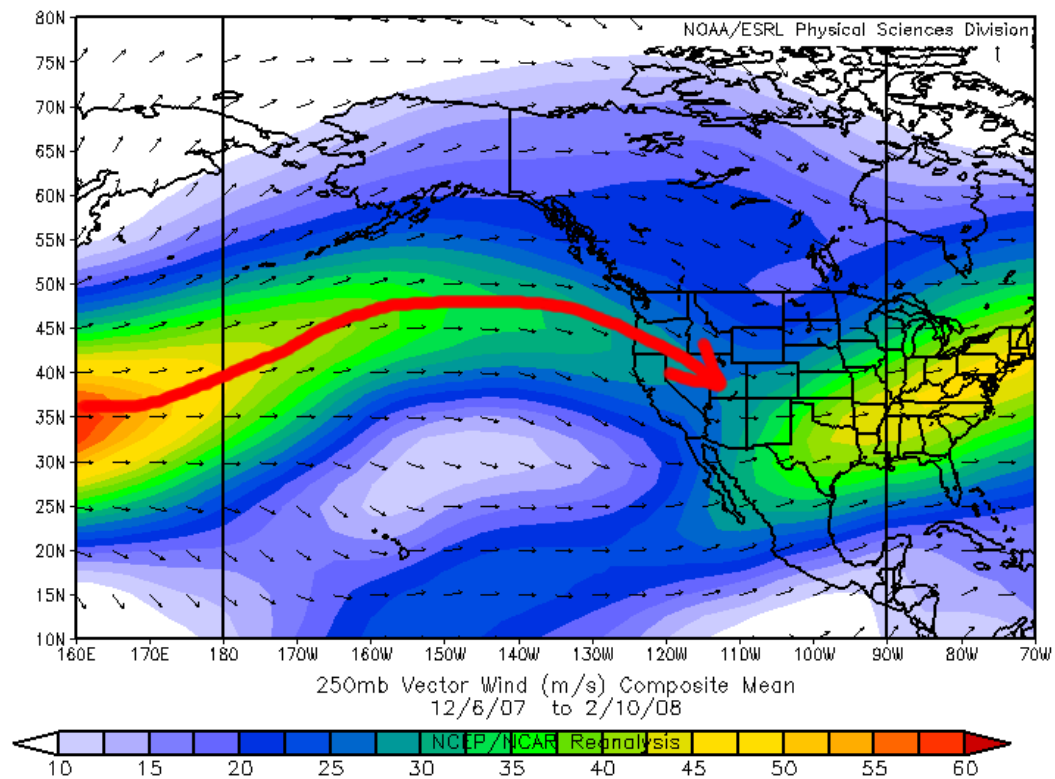
So what made this winter so much snowier compared with recent winters? In general the answer is a very strong La Nina episode. La Nina is a condition where the sea surface temperatures in the equatorial Pacific are cooler than normal (see figure below). While strong La Nina's aren't a sure bet of snowy winters in the Inland Northwest, they do tend to be colder and wetter more often than not. The last time we had a strong La Nina event was in 1998 and 1999. Mt. Baker Ski Area set the seasonal snowfall record of 1,140" in the 1998/99 winter. But in the lower elevations, recent La Nina's haven't been particularly snowy.



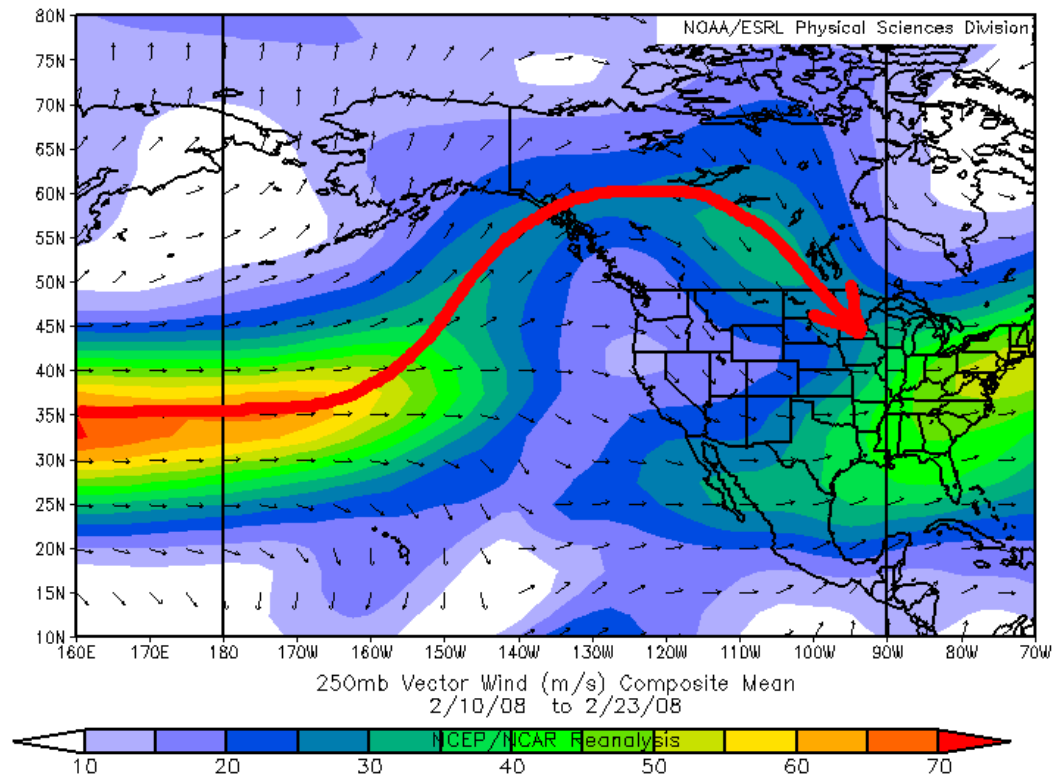
In a typical winter, the Pacific storms typically approach our area from the southwest. While this can bring heavy snow to our area, eventually the warm winds from the southwest will change the snow to rain, or at least melt the snow that has fallen. This helps to keep our snow packs relatively low in the lower elevations.



For the winter of 2007/08, the Jet Stream was oriented much differently. Pacific storms approached the area from the northwest, coming out of the northern Gulf of Alaska. Not only did these storms have more cold air to bring snow instead of rain, they didn't bring any warm air in their wake to melt the snow.



The weather pattern changed dramatically in the middle of February as high pressure shunted the jet stream well north of our area, steering the storms into northwestern Canada.



After a long snowy winter for several parts of the Inland Northwest, many of the residents were looking forward to spring in hopes of warmer weather. Unfortunately for them, the cold weather continued well into spring this year. Springtime snow, a somewhat infrequent event in this parts, became almost common-place this year.

At first **March** looked like it would deliver on the much-needed warmer weather. Similar to the latter half of February, storms were less frequent and warmer, bringing more rain than snow to the lower elevations. Temperatures were very close to normal. But by the middle of the month, the weather pattern changed. Actually, the pattern returned to what we had seen most of the winter. And the result was nearly the same. Spokane Airport had measurable snow on 10 of the last 18 days, including the last 6 days of the month (five of which set daily records).

The first storm arrived on the 20<sup>th</sup> and 21<sup>st</sup>, bringing 4-6" of snow just north and east of the Spokane area and about 2" to the metro area. A colder and wetter storm moved in on the 26<sup>th</sup>. Again, widespread 4-6" of snow fell across the northern and eastern valleys

with more in the mountains. As is typical with these springtime snows, localized areas picked up considerably more snow. A spotter near Hunters, WA received 8" and another observer near Clark Fork, ID reported an impressive 12.5" of snowfall. More snow fell on the 29<sup>th</sup>, with 12.8" reported in Rathdrum, ID and 18" of snowfall at Spirit Lake, ID. At Spokane Airport, 4.6" of snow fell on the 30<sup>th</sup>. The high temperature this next-to-the-last day of March was only 34 degrees, the coldest day of the month. When the month was finally over, Spokane had picked up 15.8" of snow, making it the 2<sup>nd</sup> snowiest March all-time.

The turn of a calendar page didn't mean a noticeable change in the weather for **April**. The morning of the 1<sup>st</sup> saw temperatures that would be considered cold even in winter. Deer Park dropped to 13 degrees while the NWS office just west of Spokane registered a low of 19 degrees. Residents in Spokane and the surrounding areas were treated to a Saturday morning snowfall on the 5<sup>th</sup> of 1 to 3", leaving many to wonder if it would ever end. But then the weather pattern finally changed as high pressure built into the region. Temperatures for the next weekend warmed suddenly in the 70s with Lewiston even reaching 82 degrees on Sunday the 13<sup>th</sup>. Residents rejoiced that spring had finally arrived. But as most of us know, spring is defined by its ups and downs. So the warm weekend was predictably cooler. Highs only reached into the 40s, with Spokane topping out at only 39 degrees on the 20<sup>th</sup> with 1.3" of snowfall. This was the latest day in the spring season that Spokane had ever stayed below 40 degrees, an impressive mark in this long, snowy year. Temperatures returned to near normal values for the end of the month. But temperatures for the month of April were 3 to 6 degrees below average.

After a chilly morning on **May 1<sup>st</sup>**, the Inland Northwest finally saw an end to the snow and a return to warmer temperatures. For the first half of the month, temperatures were near normal but the weather was dry. But then temperatures sky-rocketed. Similar to 2006, this May saw a period of extremely warm temperatures in the middle of the month. The difference between 2006 and this year was the mountain snow pack. For mid-May the snow pack was up to 150% of normal, due in part to the snowy winter, but also a result of the cool April which had delayed the normal spring melt. As valley temperatures soared into the 80s and lower 90s, with mountain temperatures in the 70s, the mountain snow started to melt in a hurry. In one week's time, many of the mountain weather sensors recorded a snow melt of 10" of liquid. That's the same as if our area had received 10" of rain in one week. The result was widespread river flooding. Many rivers in north Idaho and eastern Washington rose above flood stage. The most impressive was on the St Joe River at St Maries, where the river crested on the 22<sup>nd</sup>, 4.5 feet above flood stage. The Coeur d'Alene River at Cataldo crested 3 feet above flood stage, closing numerous roads.

The hot weather was brought to an end on the 20<sup>th</sup> as a wet cold front moved through the area, bringing up to a half inch of rain to many locations. One phenomenon noticeably absent from this spring was thunderstorms. The spring of 2008 saw much less shower activity than normal. There was an isolated strong thunderstorm on the 7<sup>th</sup> of May in which dime-sized hail covered the ground 3" deep near Priest River, ID. By

the end of the month the weather pattern had become more conducive to thunderstorms. The 28<sup>th</sup> saw numerous slow-moving wet thunderstorms in southeast Washington and the southern Idaho Panhandle. One storm east of Moscow produced hail nickel to quarter-sized for a half an hour. The result was hail so deep that Latah County snow plows had to be dispatched to clear roads. Heavy rain also washed out some roads in Garfield County. But this rainfall was unable to make up for an otherwise dry month. So after a very active winter season, the Inland Northwest actually had a precipitation deficit of 1 to 2 inches during the spring. For the water year (October 1<sup>st</sup> – present), most of the area had received below normal precipitation. The only locations with above normal precipitation were in the Panhandle and extreme eastern Washington.

Depending on your preference, the summer of 2008 could be remembered in a number of different ways. From the cold and wet start, to the dry stretch in the middle, to the cool end, this summer was quite different from recent summers.

**June** started off the summer on a decidedly cool foot. Temperatures were below normal for most of the first half of the month. Rain and showers occurred on just about every day during this stretch. The 10<sup>th</sup> turned out to be the coldest day of the month. Spokane International Airport started the morning with a chilly 36 degrees and couldn't even reach 50 for the afternoon high. Additionally, a trace of snow was observed at Spokane. Other locations actually had measurable snow, with Winchester ID reporting 0.6", and spotters near Tonasket and Oroville measuring 1.5" and 3.0" respectively. Just one day later, strong thunderstorms developed on the evening of the 11<sup>th</sup> between Freeman and Newport Washington. Golfball-sized hail fell near Mt. Spokane and heavy downpours flooded some urban areas in the Spokane Valley and Coeur d'Alene.

The weather finally began to moderate by the middle of the month. While it was far from hot, it sure felt warm compared to the previous few weeks. Temperatures warmed into the upper 80s and lower 90s on the 20<sup>th</sup> before a cold front brought rain and cooler temperatures. But before the month was over, hot weather arrived. The last 3 days of the month saw the mercury rise into the 90s and lower 100s. It was the hottest Hoopfest weekend in Spokane ever as the temperature reached 92 and 97 degrees. Lewiston soared to 105 on the final 2 days, neither of which was a record. But Wenatchee Water Plant's 105 on the 29<sup>th</sup> was a record for the day.

Warm weather continued until the 4<sup>th</sup> of **July**. Severe thunderstorms developed over the region during the last day of June and the first few of July. The strongest storms occurred on the evening of the 1<sup>st</sup> with widespread reports of 1" hail and wind damage from the Waterville Plateau and Electric City eastward to Post Falls. Thunderstorms on the evening of the 3<sup>rd</sup> dropped golfball-sized hail between Omak and Grand Coulee while 1.25" hail fell near Mazama. A very strong but dry windstorm blew through the area on the 10<sup>th</sup>. Winds gusting to 52 mph at the Spokane Airport fanned the flames on a wildfire in the Spokane Valley which destroyed several homes. Strong wind also knocked down trees onto a home and farm machinery near Bonners Ferry where winds

gusted to 54 mph. A 74 mph wind gust was measured west of Oroville.

Following this windstorm, the weather became much quieter with near-normal temperatures. On the 22<sup>nd</sup> deep sub-tropical moisture moved into the area from the south. Steady rain fell in Lewiston all afternoon bring 0.22", with similar amounts falling in most of the Idaho Panhandle.

As summer moved into **August**, the weather pattern continued to repeat. Rather than extended hot spells lasting 10 days or more, the Inland Northwest experienced brief warm-ups of a few days that were quickly followed by cooler weather. The high in Spokane on the 6<sup>th</sup> was 97, but four days later it only reached 70. Severe thunderstorms rumbled across southeast Washington and the southern Panhandle on the 8<sup>th</sup>, with flash flooding reported along Highway 2 in the Cascades. The hottest spell of the summer arrived during the middle of August. Triple-digit readings were common on the 17<sup>th</sup>, most of them breaking records for the day. Spokane Airport reached 103, making it the hottest day in 10 years. Lewiston topped out at 108, but La Crosse had the hottest reading at 109. A couple of unofficial readings of 111 were reached at Ritzville and Lake Bryan west of Lewiston.

But once again, temperatures came crashing down. By the 21<sup>st</sup>, Spokane only reached 69, a full 34 degrees cooler than just five days earlier. With the cooler weather came widespread rain and showers. Thunderstorms over Oregon on the afternoon of the 18<sup>th</sup> produced strong gusty winds over much of northeast Washington. Heavy rain fell in the Cascades on the 19<sup>th</sup> with up to 1.50" reported in the mountains and 0.82" at Twisp. On the 21<sup>st</sup> scattered showers and thunderstorms moved through the region with one storm dropping 1" hail in the Spokane Valley.

So, was this a cool summer? The average temperature for the 3 months would say that it was pretty close to average. So why did it seem cooler than normal? Rather the use average temperature (which tends to mask the temperature swings), lets look at it in terms of the number of days which were 90 degrees or warmer, and the number of days that were 75 degrees or cooler. The table shows these numbers for the past 10 years. The numbers show that the summers of 2006 and 2007 were quite warm compared to average. While this summer was similar to 2005 for Wenatchee and Spokane, Lewiston hasn't seen a summer this cool since 2002. So part of the answer lies in the fact that while the average temperature for this summer was very close to normal, it was quite a bit cooler than the past 2 summers and cooler than 4 of the last 5 summers. In other words, we've become used to the recent warm summers, so a "normal" summer feels cool to us.

**Number of Days June-August At or Above 90 F**

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Avg
Wenatchee	25	32	17	22	20	49	25	38	33	29	30
Lewiston	37	35	39	26	46	44	42	45	46	37	40
Spokane	18	13	16	14	27	25	16	22	22	17	17



**Number of Days June-August At or Below 75F**

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Avg
Wenatchee	23	13	18	9	6	15	26	11	16	14	14
Lewiston	21	15	18	9	7	15	16	11	11	16	14
Spokane	40	28	31	27	15	29	28	24	25	31	30

Beautiful autumn weather was in store this year for residents of the Inland Northwest, once again making it one of the best times of year in this area. Temperatures in general were on the mild side with lots of sunshine.

**September** got off to a chilly start. Low temperatures on the morning of the 1<sup>st</sup> were in the 30s and lower 40s in northeast Washington and the northern Panhandle, including a 31 degree reading at Priest Lake and 28 at the Turnbull National Wildlife Refuge near Cheney. Daytime temperatures gradually warmed back into the 70s and lower 80s. By the middle of the month the mercury had risen to the upper 80s and lower 90s for a warm 5 day stretch. Lewiston recorded a high of 96 on the 19<sup>th</sup>. A number of locations in southeast Washington and the southern Panhandle set daily high temperature records. But as is typical for these warm spells in autumn, they usually precede a sharp cool-down. High temperatures on the 20<sup>th</sup> were markedly cooler, with most locations in the 60s and lower 70s, about 20 degrees cooler than the previous day. The cold front responsible for this cool-down came up from Oregon and brought quite a bit of rain to the area, mainly over the Panhandle and extreme eastern Washington. Lewiston picked up 0.67" of rain while Kellogg received 0.58". Temperatures remained on the cool side before warming to about 10 degrees above normal by the end of the month.

This new warm spell lasted into early **October**. The 1<sup>st</sup> was the warmest day with widespread readings in the 80s and a few 90s. Colville, LaCrosse and Lewiston all tied or set daily high temperature records. But that was the last of summer warmth as light rain moved in and temperatures gradually dropped each day. After reaching the 80s on the 1<sup>st</sup> most locations struggled to make it into the 50s on the 9<sup>th</sup>. Lewiston set record lows of 28 and 29 on the 11<sup>th</sup> and 12<sup>th</sup>. Nearby Pomeroy dropped all the way to 19 degrees on the 12<sup>th</sup>. The remainder of the month featured some gorgeous fall weather. Chilly mornings gave way to sunny afternoons in the 50s and 60s. Rainfall was rather infrequent which resulted in a precipitation deficit for most sites in October.

**November** started off on a mission to make up for the relatively dry October. The first 12 days of November had rain (or snow) for most locations. Spokane had its first measurable snow of the season on the 6<sup>th</sup>, but it melted almost as quickly as it fell. Plain, WA picked up 2" while Boyds (northwest of Colville) and Malott (south of Omak) both received 1.5" of snow. This cold weather pattern was quickly replaced by a warm wet one as a "Pineapple Express" developed. Heavy rain fell in the Cascades and the Idaho Panhandle. Pullman received 1.57" of rain on the 12<sup>th</sup>. This not only set a record for the day, but it was also the 2<sup>nd</sup> wettest day ever for Pullman in November. Plain

picked up an impressive 4.12" of rain in 24 hours. This was the wettest November day ever in Plain, breaking the old record of 3.78" which was set only 2 years earlier. The Stehekin River briefly reached flood stage.

But this event also spelled the end of the wet weather for the remainder of the month. Weak Pacific fronts continued to move through the Northwest every few days but they generally brought little in the way of precipitation. Between the fronts the weather was mild without much fog. As the Thanksgiving holiday weekend approached, that pleasant weather pattern changed. A cold front on Tuesday the 25<sup>th</sup> brought just enough moisture to allow the Columbia Basin to sock in with fog and stratus. After a mostly gray Thanksgiving, a weak Pacific weather system brought a couple of inches of snow on Friday the 28<sup>th</sup> to many locations north and east of Spokane. But temperatures continued to warm and the fog and drizzle melted the snow as the month ended on a rather drippy note.

Overall the Fall of 2008 was mild and dry in the Inland Northwest. Cold weather was hard to come by and many locations still hadn't seen any snowfall by early December. In fact, Missoula, MT did not have any measurable snowfall in October or November, which has happened only twice in the past 54 years.

The winter of 2008/09 will long be remembered by many residents of eastern Washington and northern Idaho. But as is typical for around here, one location's stormy winter is another location's drought. So while snow was abundant for folks in Spokane and surrounding areas, others in Wenatchee and the east slopes of the Cascades actually had well below normal snowfall.

The first 11 days of **December** were rather mild and snow-free. In fact, some were beginning to wonder if we would see much of a winter at all after a mild November. High temperatures were consistently above freezing, reaching 44 degrees in Spokane on the 10<sup>th</sup>. But the weather pattern changed dramatically on the 11<sup>th</sup> as very cold arctic air moved into the western US. While cold air from the north isn't necessarily unusual, the strength and southward push of this event were noteworthy. Snow would eventually be reported in locations such as southern California and Las Vegas. Initially the arctic front only brought a few inches of snow to Spokane, while points north and east of the city picked up nearly a foot. But temperatures remained very cold, with highs in the single digits and teens.

The first in the series of snowstorms on the 17<sup>th</sup> and 18<sup>th</sup> is one that will long be remembered. Snow began midday on the 17<sup>th</sup> and by 4pm there was already 4-8" on the ground. Snow continued overnight and through much of the day on the 18<sup>th</sup>. The 24-hour snowfall record at Spokane was 13.0" set back in January of 1950. That record was shattered with 19.4" of snow at Spokane Airport. The 2-day storm total was more than 23", an incredible amount for the Spokane metro area. Some outlying areas in north Idaho picked up 3 feet of snow. The heavy snow was actually confined to a rather small area, with double-digit snowfall reported at locations between Chewelah south to Colfax.

A short 2 day break allowed low temperatures on the morning of the 20th to drop below zero in many locations. Spokane Airport reached -18F while other valley locations in North Central Washington reached temperatures as cold as -25F. Heavy snow moved in on the morning of Sunday the 21st and continued until midday Monday. This storm brought 4+" to nearly the entire Inland Northwest area. Spokane officially measured 8.9" from this storm.

Another 2 day break allowed residents to do more shoveling. But a strong storm moved in on Christmas Eve. Heavy snow started in Spokane in the afternoon and ended during the night. Yet another 6.1" of snow fell in Spokane. To the west, Davenport picked up 8" and up north, Sandpoint recorded nearly 9" of snow.

Even after the Christmas storm, light snow continued to fall. One to 3 inches of snow fell each of the next 3 days before the snow actually changed to light rain in some locations on the 28th. In some of the Cascade valleys, up to 12" of snow fell on the 27th. Snow crews worked nearly continuously to clear the snow. But in downtown Spokane, there just wasn't enough places to put the snow. Multi-laned arterial roads lost one lane due to snow berms, resulting in numerous traffic jams.

When December was all said and done, numerous snowfall records had been broken. In addition to the all-time 24-hour snowfall record, December 2008 is now the snowiest month ever in Spokane. Other cities in the U.S. also had their snowiest December ever, including Boise ID, Madison WI, and Bismarck ND.

## Site: Wenatchee, WA (Water Plant)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
Average High Temp	30.2	45.2	53.2	59.3	74.3	78.5	89.1	86.6	78.9	62.6	47.7	29.8	61.3
Dep from Normal	-4.9	+2.4	-1.7	-5.3	+1.2	-1.6	+1.3	-0.6	+1.2	-1.1	+1.8	-5.9	+0.6

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
Average Low Temp	17.9	27.8	32.2	36.5	50.5	54.6	61.4	60.0	50.6	39.6	35.3	18.5	40.4
Dep from Normal	-5.3	+0.4	-1.7	-4.3	+1.9	-0.9	+0.5	-0.2	-0.6	-1.2	+3.1	-6.7	-1.4

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
Precipitation	0.94	1.00	0.31	0.15	0.11	0.18	Tr	0.16	0.12	0.46	1.87	1.22	6.52
Dep from Normal	-.41	+.06	-.33	-.36	-.40	-.51	-.30	-.25	-.28	-.03	+.51	-.30	-1.92

## Site: Lewiston, ID

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
Average High Temp	39.7	49.0	51.4	58.7	73.1	78.9	90.4	88.5	80.0	64.3	51.3	36.5	63.5
Dep from Normal	+0.3	+3.4	-2.4	-2.9	+3.2	+1.0	+2.8	+0.9	+3.3	+2.4	+4.5	-2.7	+1.2

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
Average Low Temp	26.2	33.6	32.9	35.4	48.9	52.2	59.6	59.7	50.6	39.6	35.3	24.3	41.5
Dep from Normal	-1.7	+2.4	-2.7	-5.2	+2.0	-1.5	+0.3	+0.4	-0.6	-1.2	+3.1	-4.2	-0.9

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
Precipitation	0.75	0.42	0.72	0.53	0.95	0.69	0.23	0.82	0.75	0.39	0.90	1.60	8.75
Dep from Normal	-.39	-.53	-.40	-.78	-.61	-.47	-.49	+.07	-.06	-.57	-.31	+.55	-4.18

## Site: Spokane, WA

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
Average High Temp	31.2	38.3	43.6	52.0	68.6	72.5	83.8	81.9	74.2	58.8	44.6	27.8	56.4
Dep from Normal	-1.6	-1.0	-5.0	-5.5	+2.4	-1.4	+1.3	-0.7	+1.7	+0.3	+3.5	-5.0	-0.8

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
Average Low Temp	18.2	25.5	29.0	32.0	45.1	49.1	56.7	55.4	47.7	36.8	32.5	16.0	37.0
Dep from Normal	-3.5	-0.2	-1.4	-3.5	+2.5	-0.1	+2.1	+0.9	+1.8	+1.0	+3.8	-5.6	-0.2

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
Precipitation	3.18	0.93	1.86	1.27	0.93	1.00	Tr	0.57	0.54	0.30	1.69	3.94	16.21
Dep from Normal	+1.36	-.58	+.33	-.01	-.67	-.18	-.76	-.11	-.22	-.76	-.55	+1.69	-0.46

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
Snowfall	40.0	9.0	15.8	4.8	0	Tr	0	0	0	0	1.5	61.5	132.6
Dep from Normal	+25.8	+2.3	+12.2	+3.9	-0.2	0	0	0	0	-0.3	-4.9	+46.4	+86.2